PATENT COOPERATION TREATY

Rec'd PCT/PTO 31 MAY 2005

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To:

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Recd

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

	Date of mailing *(day/month/year)* 05-11-2004
Applicant's or agent's file reference 20021425 WO	IMPORTANT NOTIFICATION

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/FI2003/000572	17-07-2003	31-07-2002

Applicant
Outokumpu Oyj
et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in som Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, intentive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see Also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/		Authorized officer
Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Telex 17978 PATOREG-S	Marita Öun Telephone No. 08-782 25 00

Form PCT/IPEA/416 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 20021425 WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI 2003/000572	International filing date *(day/month/year)* 17.07.2003	Priority date *(day/month/year)* 31.07.2002
International Patent Classification (IPC) or national classification and IPC C25F 1/04		
Applicant Outokumpu Oyj et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☒ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
10.12.2003	01.11.2004
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Ingrid Grundfelt/ELY Telephone No. +46 8 782 25 00

INTERNATIONAL PRE[redacted]INARY REPORT ON PATENTABILITY

International application No.
[redacted]/FI 2003/000572

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4)
- ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-5 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 6-7 received by this Authority on 12.10.2004
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRE[redacted]NARY REPORT ON PATENTABILITY

International application No.
[redacted]/FI 2003/000572

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims	1-16	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1) GB-586 250-A
D2) US-5 795 460-A
D3) US-1 773 160-A
D4) Derwent´s abstract of JP-50005988-B
D5) US-4 545 877-A
D6) US-5 639 360-A
D7) WO-02/32595-A1
D8) US-4 544 462-A

The present invention relates to a method and to an arrangement for removing oxides from metal objects, such as wires, which are based on copper alloys. The aim of the invention is to solve problems that arise when utilising methods according to prior art, in order to achieve copper surfaces of a good quality. After removing the copper oxides according to the invention, it is possible to perform a speeded up continuously operated extrusion of the objects, such as wires. The creation of extrusion scrap is avoided, and the working life of the equipment can be extended in relation to prior art.

Amongst the documents cited in the search report, document D1 comes closest to the invention according to the amended claims of October 12, 2004.

D1 (p.2, lines 121-129 and p.3, lines 56-71) describes a process for removing oxide from the surface of an article that

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

is made of metal, such as copper. The process involves electrolysing in an electrolytic cell, in which the article constitutes the cathode. In order to deflect oxygen formed at the anode out of the apparatus, diaphragms are emplaced in the cell.

The method in claim 1 and the arrangement in claim 16 differ from what is disclosed in D1 in performing a continuously operated extrusion treatment after removing copper oxides. Hence, the invention is novel.

The problems in connection with continuously operated extrusion treatments to be solved by the present invention (cf. first paragraph on this form) are not disclosed in D1. This document does not give any indication that would lead a person skilled in the art to the claimed method and arrangement. Therefore, the claimed invention is not obvious to a person skilled in the art.

Consequently, the invention according to claims 1-16 is considered to involve an inventive step. It is further considered to be industrially applicable.

However, concerning observations on clarity in claims 1 and 16, see Box VIII.

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

According to PCT Article 6, the claim or claims shall define the matter for which protection is sought. Claims shall be clear and concise. They shall be fully supported by the description.

Claims 1 and 16 do not contain all the features considered to be necessary to define the invention in accordance with the aim of the invention:

Claims 1 and 16 are vaguely defined due to the expression: "such as an anode (6), a cathode (5) and an electrolyte (11)". "such as" does not limit the claims to the type of cathodic reduction stated on lines 25-27 in claim 16 (cf. also fig 2). This type of cathodic reduction is considered to be necessary, in order to obtain the result to be achieved by the invention.

CLAIMS

1. A method for manufacturing continuous material made of a copper-based metal alloy, according to which method the continuous material is treated at least in an oxide removal unit (3), where the oxides are removed from the continuous material surface by means of cathodic reduction, such as an anode (6), a cathode (5) and an electrolyte (11), **characterized** in that after the oxide removal unit (3), the continuous material made of a copper-based metal alloy is conducted into continuously operated extrusion treatment (4).

2. A method according to claim 1, **characterized** in that in cathodic reduction, the employed electrolyte (11) is sodium carbonate solution.

3. A method according to claim 1, **characterized** in that in cathodic reduction, the employed electrolyte (11) is sulfuric acid solution.

4. A method according to claim 1, 2 or 3, **characterized** in that in cathodic reduction, the employed cathode (5) is an object made of a copper-based metal alloy, and the employed anode (6) is a non-soluble material.

5. A method according to claim 4, **characterized** in that the employed anode (6) is a non-soluble material, such as platinum.

6. A method according to any of the preceding claims, **characterized** in that in cathodic reduction, on the anode (6) there is created oxygen and on the cathode (5) there is created copper.

7. A method according to claim 4, 5 or 6, **characterized** in that in connection with the anode (6), there is arranged at least one oxygen exhaust aperture (7) for enabling the exhaustion of oxygen.

8. A method according to any of the preceding claims, **characterized** in that in cathodic reduction, there is used an ion-selective membrane (8) that is impermeable to oxygen.

9. A method according to claim 8, **characterized** in that the membrane is placed between the anode and the cathode in order to prevent the oxygen from proceeding from the anode to the cathode.

10. A method according to claim 8 or 9, **characterized** in that the membrane (8) is arranged symmetrically around the cathode, so that it surrounds the whole cathode (5).

11. A method according to any of the preceding claims, **characterized** in that an object made of a copper-based metal alloy is subjected to a preliminary washing prior to the cathodic reduction.

12. A method according to any of the preceding claims, **characterized** in that an object made of a copper-based metal alloy is subjected to etching by sulfuric acid prior to the cathodic reduction.

13. A method according to claim 12, **characterized** in that sulfuric acid films are removed by mechanical drying.

14. A method according to any of the preceding claims, **characterized** in that after cathodic reduction, the object is subjected to a rapid pressurized water washing.

15. A method according to claim 14, **characterized** in that the oxide removal unit (3) and the working process (4) are insulated from the surroundings by protective gas.

16. An arrangement for realizing the method according to claim 1 for manufacturing continuous material made of a copper-based material, said arrangement comprising at least an oxide removal unit, **characterized** in that the arrangement includes elements for realizing a cathodic reduction, such as an anode (6), a cathode (5) and an electrolyte (11), so that the access of the gas created on the anode to the cathode is prevented by a membrane (8) that is impermeable to oxygen and means for continuously operated extrusion treatment (4).